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Rev. H. Lloyd, D. D., read the second part of a paper "on the Meteorology of Ireland, as deduced from the observations made in 1851 under the direction of the Royal Irish Academy."

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JANUARY 9TH, 1854.

THOMAS A. LARCOM, Esq., V. P., F. R. S., &c.,  
in the Chair.

J. Thomas Rosborough Colclough, Esq.; and J. Butler Pratt, Esq., were elected Members of the Academy.

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On the recommendation of the Council it was Resolved :—

To insert the following By-Law, between Nos. 6 and 7 of Chap. VII. of the Statutes of the Royal Irish Academy :—

"Donations received and acknowledged."

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The Secretary presented, from James F. Bland, Esq., a very exact and beautiful model of that remarkable and curious ancient structure called Staig Fort, situated on the property of Mr. Bland, near Kenmare, county Kerry. The model was made of portions of stone selected from the original building, and constructed on the spot by Messrs. Thomas and William Jermyn, the tenants of the farm on which the Fort stands.

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Professor Allman read a paper on the structure of the starch granule obtained from the potato.

The author combated the theory of involution recently proposed by Martin, and modified by Busk; he maintained that the conclusions to which these observers arrived were drawn from incorrect interpretation of the phenomena, and that the appearance of unrolling or unfolding of the granule

under the action of hot water or mineral acids was a purely secondary phenomenon, and dependent on a condition induced in the granule by the action of these reagents. The immediate effect of this action is a swelling up of the granule, but the latter, not at once responding to the action of the reagents *uniformly over its whole surface*, certain portions of the surface are first elevated into ridges or projections, which necessarily leave depressions of greater or less depth between them, and the appearances which have been mistaken for an unrolling or unfolding of the original granule are due to the act of formation of these ridges, but especially to the rolling outwards of the intervening depressions when these, in their turn, almost immediately afterwards, respond to the action of the reagents.

The author believes that there is no difficulty in demonstrating in the most undeniable way the composition of the starch granule out of a series of hollow concentric lamellæ. If potato starch previously exposed to the *prolonged* action of a rather weak alcoholic solution of iodine be treated under the microscope with sulphuric acid diluted with about one-fourth water, the granules will, for the most part, present a beautiful dissection of the lamellæ from one another, which will then be plainly seen to consist of a series of hollow concentric shells. In this experiment a solution was generally employed formed by mixing equal parts of water and the common tincture of iodine; and the granules were exposed to its action for the space of two or three weeks.

The author also maintained, that while the various lamellæ are probably all identical in chemical composition—for they present no difference in their behaviour towards iodine,—they possess, nevertheless decided differences of another kind, which appear to be referable to conditions of integration.

These differences are beautifully demonstrated by the action of acetic acid on the granule, previously slightly iodinated and treated with sulphuric acid; when thus operated on, the

internal layers will be seen to withdraw themselves from the external, in the form first of a wrinkled membrane ; and this, gradually contracting towards the centre, the granule will finally appear as a spherical smooth-walled vesicle, with fluid contents, and with an irregular nucleus-like body—the altered internal layers—lying upon some part of the inner surface of its walls.

The author believes, with Schleiden, that the so-called “nucleus” of Fritsche is a minute cavity in the unaltered granule, becoming greatly enlarged by the action of a high heat, as in roasting. The contents of this cavity are rendered blue by iodine, and assume a granular appearance under the action of acetic acid ; they are probably fluid or amorphous amylum.

From the appearance frequently presented by the granule under the operation of certain re-agents, and especially during the commencing action of hot water, it would seem to follow that there are definite lines of cleavage in the granule at right angles with the concentric lamellæ.

In conclusion, the author maintained, that the structure of the starch granule, as advocated in the present paper, was much more in accordance with the centripetal than with the centrifugal theory of its growth ; but that, while it is to be viewed as really a laminated vesicle, it cannot be properly included in the category of the true organic cell.

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Dr. Neligan objected, that if the internal and external coats of the potato starch granule be different in constitution, the chemical test commonly applied to distinguish the different kinds of starch would be inapplicable. Wheaten starch, when triturated slightly, is not as readily coloured by iodine as the starch produced from potatoes, and this seemed to him to be inconsistent with Dr. Allman’s theory.

Mr. L. Moore made some observations in reference to the experiments and observations made by Dr. Allman and others who have studied the structure of the starch granule.